

Claims

1. Medical system for detecting heart events including an electrode lead provided with a multi-dot electrode unit (4) that comprises at least three dot electrodes (8), said multi-dot electrode unit is adapted to be used for intra-
 5 corporal sensing of heart signals,
 characterized in that heart signals sensed by each of the dot electrodes are applied to a processing means (18, 20, 22, 24) where the signals are combined and a synthetic reference (SR) signal is determined, the differences between each dot electrode heart signal and the synthetic reference voltage are
 10 determined, and an indication signal is formed based upon said differences, wherein said indication signal is used to detect heart events.
2. Medical system according to claim 1, characterized in that the synthetic reference signal (SR-signal) is determined according to the formula:
 15 $SR\text{-signal} = 1/N \times \sum (U_1 + \dots + U_N)$, where
 N is the number of dot electrodes, and
 $U_1 \dots U_N$ are the dot electrode potentials in relation to an electrical reference point.
- 20 3. Medical system according to claim 2, characterized in that for each dot electrode a differential dot electrode value $A_{diff(i)}$ is determined by the formula:
 $A_{diff(i)} = U_i - SR\text{-signal}$, where $i = 1 \dots N$.
- 25 4. Medical system according to claim 3, characterized in that said indicating signal is formed by adding together the absolute values of $A_{diff(i)}$, where $i = 1 \dots N$.
5. Medical system according to claim 3, characterized in that
 30 said indicating signal is formed by adding together the squared values of $A_{diff(i)}$, where $i = 1 \dots N$.
6. Medical system according to claim 3, characterized in that said indicating signal is based upon the signal contents of $A_{diff(i)}$, where $i = 1 \dots N$.

7. Medical system according to claim 1, characterized in that said indication signal is applied to a discrimination means adapted to generate an detection signal if the indication signal fulfils predetermined heart event
5 detection criteria.

8. Medical system according to claim 1, characterized in that said processing means is arranged in said electrode lead in connection with the multi-dot electrode unit.
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9. Medical system according to claim 1, characterized in that said multi-dot electrode unit is arranged at the distal end of said electrode lead.

10. Medical system according to claim 1, characterized in that
15 said synthetic reference signal is determined as the average value of at least three of the detected dot electrode potentials.

11. Medical system according to claim 1, characterized in that said processing means is arranged in an implantable medical device and
20 electrically connected to the multi-dot electrode unit via conducting means in said electrode lead.

12. Medical system according to claim 1, characterized in that multi-dot electrode unit may also be used to apply stimulation pulses to tissue.
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13. Medical system according to claim 1, characterized in that said processing means is adapted to change mode of operation for the multi-dot electrode unit between a detection-mode and a stimulation-mode.
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